WASTE STORAGE POND (No.)

Definition

An impoundment made by excavation or earthfill for temporary storage of animal or other agricultural waste.

Scope

This standard establishes the minimum acceptable requirements for design, construction, and operation of waste storage ponds. Embankments are limited to an effective height of 35 ft. or less and to hazard class (a). This standard does not apply to waste treatment lagoons or to waste storage structures.

Purpose

To store liquid and solid waste, waste water, and polluted runoff to reduce pollution and to protect the environment.

Conditions Where Practice Applies

This practice applies where: (1) an overall waste management system has been planned; (2) waste is generated by agricultural production or processing; (3) storage is necessary to properly manage the waste; (4) a holding pond is needed for waste water and rainfall water and runoff storage as a part of lagoon waste treatment system, and (5) soils and topography are suitable for construction.

Planning Considerations

Locations. Waste storage ponds should be as close to the source of waste and polluted runoff as practicable. Due consideration should be given to economics, the overall waste management plan, and health and safety factors. The ponds should be located where prevailing winds, vegetative screening, and building arrangement minimize odor and visual resource problems. Nonpolluted runoff should be excluded to the fullest extent possible.

Waste storage ponds shall be located a minimum of 400 feet from all residences other than the owner's. More separation from residences is advisable, when possible. The minimum lagoon distance from residences shall apply when a waste storage pond is built in conjunction with a waste treatment lagoon.

Waste storage ponds shall not be located on flood plains unless they are protected from inundation or damage from a 100-year flood event.

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The distance from the waste storage pond to the nearest well shall be at least 200 feet, unless approved by a geologist. Lagoons should not be located on steep slopes above wells.

Solids Separation. To minimize frequency of solids removal from runoff storage ponds, direct polluted runoff through vegetative filter strips, low-gradient channels, or debris basins to remove readily settleable solids. Settling facilities should have adequate capacity to store settled solids for a reasonable period, based on climate, equipment, and method of disposal. If animal manure, such as from dairy cows, is flushed into a storage pond, a solids separator may be provided for removing fibrous solids to facilitate pumping and irrigation.

Design Criteria

Soil and Foundation. Locate pond on soils of slow to moderate permeability or on soils that can seal through sedimentation and biological action. Avoid gravelly soils and shallow soils over fractured or cavernous rock. If self-sealing is not probable, the storage pond shall be sealed by mechanical treatment or by the use of an impermeable membrane. Do not construct to an elevation below the seasonal high water table unless considered as a special design.

The "Soil and Foundation" portion of the practice standard for Waste Treatment Lagoon (359) shall also apply.

Storage Period. The storage period is the maximum anticipated length of time between emptying, based on climate, crops, equipment, and labor.

It is recommended that the pond have sufficient volume to store the waste and runoff water for six (6) months for better flexibility of timely land application.

The minimum storage period shall be:

1. One hundred days where the waste is applied to the land by use of liquid manure tanks which require the trafficing of equipment over land and crops.

2. Sixty days for systems where waste is conveyed by flushing or washing and in other systems where runoff is collected from large areas, and where a waste storage pond is used with a lagoon.

3. Thirty days where waste is scraped to the system, where the quantity of wash water is less than 500 gallons per day, the drainage area is less than 5,000 square feet and the system has the equipment installed to empty the waste holding pond within the holding period.

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The landowner shall be committed to emptying the waste storage pond within the storage time frame and the operations and maintenance plan shall so reflect.

Design Volume. Waste storage ponds shall store the design volume. Design volume is the minimum volume required to store waste for the storage period. It is the total of the following:

With drainage area --	Without drainage area --
1. Manure, waste water, and normal runoff[1]	1. Manure and waste water
2. Normal precipitation less evaporation on pond surface[1]	2. Normal precipitation less evaporation on pond surface
3. 25-year, 24-hour runoff	3. 25-year, 24-hour precipitation on pond surface
4. Solids accumulation[2]	4. Solids accumulation

Additional storage can be provided to meet management goals or regulations.

The minimum waste storage pond volume shall be one-third (1/3) of the required lagoon volume when used as part of a Waste Treatment Lagoon system.

Elevation markers shall be installed to indicate when the lower limit of the volume for 25-year - 24-hour rainfall and/or runoff is not utilized. This elevation is the maximum elevation that the waste storage pond shall be allowed to fill to before drawdown is commenced. This shall also be included as a part of the operation and maintenance plan.

Inlet and Outlet. Inlets to storage ponds can be of any permanent type designed to resist erosion, plugging, and, if freezing may be a problem, damage by ice. If slurry and solid waste is stored, the inlet should be designed so that waste will be deposited near the center of the pond.

There shall be no outlet that can automatically release storage from the design volume. An emergency spillway, overflow pipe, combination of spillways, or additional storage shall be provided to protect the facility from overtopping during a 25-year, 24-hour storm occurring when the design volume is filled. Spillway requirements, however, do not apply to waste storage ponds without drainage areas.

The settled top elevation shall be a minimum of two (2) feet above the maximum operating level of the waste storage pond.

[1] Accumulated during the storage period.
[2] For the period between solids removal. This applies mainly to ponds used to store waste water and polluted runoff and refers to the residual solids after the liquids have been removed.

Earth Embankment. The design height of the embankment shall be increased by the amount needed to insure that the design top elevation will be maintained after settlement. This increase shall not be less than five (5) percent. The minimum top width shall be eight (8) ft. The combined side slopes of the settled embankment shall not be less than five (5) horizontal to one (1) vertical. Wider top widths shall be installed for agitating and/or pumping equipment when used.

Waste storage ponds should be constructed relatively shallow (6' deep or less) and should be compatible with the planned agitating and hauling equipment.

Disposal Facilities. Waste shall be removed from storage and used or disposed of at locations, times, rates, and volumes shown in the overall waste management plan without polluting the surface or ground water. Waste may be liquid, slurry, or solid, and proper equipment must be available to remove and apply it to the land.

If polluted runoff is stored, liquids shall be removed promptly to insure that sufficient capacity is available to store runoff from subsequent storms. The maximum allowable emptying time shall be based on the chance of overflow from subsequent storms and on the capacity of the disposal area.

Provisions shall be made for removing solids from storage ponds to preserve the storage capacity. The method or removal must be considered in planning, particularly in determining the size and shape of the pond. For ponds built to store runoff and waste water, an entrance ramp having a slope of 4:1 or flatter may be used. For those built to store slurry and solid waste, some type of emptying facility must be provided. It may be a dock, a pumping platform, a retaining wall, or a ramp having a slope of 7:1 or flatter. Ramps should have protective coverings of concrete or gravel so that they can be traversed during operation and maintenance activities.

Management

The holding pond will be emptied before it is filled to the volume designated to store waste and runoff during normal periods. The volume designated to store the 25-year, 24-hour storm is to be used to store water from large, infrequent storms. The holding pond must be emptied as soon as practical after large storms occur.

Effluent from the holding pond shall be retained on the property of the owner. Where the influent volume is large, either a sprinkler or flood irrigation system shall be used to spread the contents on surrounding farm land. Where the influent volume is small, the contents may be disposed of by pumping or siphoning on areas where liquids will evaporate and seep into

the ground. Holding ponds must be emptied during dry weather and the contents must not be spread on frozen ground or when rain is expected within 24 hours.

Holding ponds used to store solids will require manure slurry handling equipment for disposal on farm land.

Protection. The waste storage pond shall be fenced and warning signs posted to prevent children and others from using it for other than the intended purpose. The embankment and surrounding areas shall be vegetated to control erosion. Vegetative screens or other methods should be used to shield the pond from public view and to improve visual conditions.

The fence shall be at least forty-eight (48) inches high and the lower thirty-two (32) inches shall be woven wire. The fence shall be placed at locations which will not deter mowing and maintenance. Backslopes of waste storage ponds shall not be grazed.

Plans and Specifications

Plans and specifications for waste storage ponds shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall contain, as a minimum, all of the requirements of Waste Management System, P.S. 312.

Soil Conservation Service

Construction Specifications
for
425 - Waste Storage Pond

Scope

This specification shall include all work, material and services necessary for the construction of a waste storage pond. The completed waste storage pond will conform to the lines, grades and dimensions shown on the drawings, staked in the field or approved by the responsible official. All work shall be performed in a skillful and workmanlike manner. The completed job shall present a workmanlike appearance.

Waste Storage Ponds shall be constructed in accordance with the construction specifications for Practice Standard 312, Waste Storage Pond System.

Construction Details. _____